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Read March 10th 1828
Inaugural Essay
On

Fractures Dislocations &c.
for the
Degree of Doctor of Medicine
in

The University of Pennsylvania.
By

Ruben A Gentry
of
Williamson County Tennessee.

Philadelphia January 15th
1828

the
Post. Oct. 10. 1831

Dear Sir

I have the pleasure to
acknowledge the receipt of your letter of the 10th inst.

and in reply to inform you that the same has been forwarded to the proper authorities for their consideration.

I am, Sir, very respectfully,
Your obedient servant,

Wm. L. G. Smith

William L. G. Smith

Secretary of the Board of Education

To

Benjamin M. Dudley, M.D.
Professor of Anatomy and Surgery in
Transylvania University.

Dear Sir,

Your unvaried endeavours, as a public and private preceptor in conducting me through the bewildering labyrinths of sophistry and error, to those simple and elementary truths, from the lights of which, the scientific physician can alone expect to direct his way; together with many acts of individual kindness, have fixed upon my memory, feelings of gratitude and affection, which will only cease with the term of my existence. For these multiplied benefits, permit me to inscribe to you this humble epay—as an assurance of the warm estimation in which I hold you, as an ind

individual of pre-eminent worth, talents, and attainments.

That the brilliancy of your professional career may be unclouded; that the profession may ever be proud of your superior talents, extensive acquirements, and great usefulness; and that your life may be long, prosperous, and happy, is the heart-felt wish of

Dear Sir,

Your sincere friend, and
Affectionate pupil,
R. V. Gentry.

Fractures

A fracture is a solution of bone into two or more fragments. When the bone alone is divided, the fracture is called simple. When in addition to the solution of bone, the soft parts covering it are divided, the injury receives the appellation of compound fracture. When the bone is broken in several places, or when the fracture is accompanied by laceration of large vessels, or by dislocation, it is termed complicated. In addition to the simple, compound, and complicated, according to their direction, fractures are called transverse, oblique, longitudinal, &c.

External violence and muscular action, separately, and combined, are the causes of fractures. Swelling and deformity, may be considered the most unequivocal signs of fracture. To these may be added, as occurring in many

Swelling, pain, discolouring, and inability to move the limb.

Generally, the first appearance which presents itself to the surgeon, in his examination of a fracture, is the displacement of the ends of bone; hence, the first indication, is the reduction of the fragments to their natural situation. After the ends of bone are placed in apposition, the contractile power of the muscles, has a constant tendency to separate them, and when separated, to draw them into their substance, which they irritate, and excite to additional contraction. In this way, the limb is sometimes reduced to two thirds its original length, and the soft tissues very much lacerated. From these facts it is obvious, that the complete suspension of muscular action, is one of the most important indications, in the treatment of fractures.

When violence has been offered any part, nat.

are, to restore the part to its pristine healthy condition, instituted a protective action, and when unrestrained, generally transcends the bounds compatible with speedy recovery. Now as a high grade of inflammation, is known not to be in harmony with the recuperative process, the prevention, or when it has occurred, the removal of it, is by some the most important indication in the treatment of fractures.

The pain attending fractures is in some cases almost insupportable, and the removal or mitigation of it, not only conduces to the comfort of the individual, but guarantees the favourable termination of the accident.

To fulfil the first indication, we resort to extension, counter-extension, and coaptation.

To suppress muscular action, and control inflammation, I recommend the bandage or roller

Having recommended the bandage, I deem it necessary, and not irrelevant to the subject, to make a few remarks on its application.

The salutary effects of the bandage depend on its judicious application, and I have no doubt, that the consequences arising from its improper application, have caused it to be censured and discarded by many, as producing serious and pernicious consequences.

A very common mode of applying it, is to bind it tightly around the part sustaining injury, leaving the parts below, unprotected by it. In this way, it acts precisely as a ligature, producing derangement in the circulation, particularly of the venous blood, and consequent tumefaction, sloughing, and mortification.

In applying the bandage, we should invariably commence directly at the extremity of the limb, and taking care to make regular

and uniform compression, by covering half of each turn by the succeeding one, should continue it some distance above the injured part. When used in fractures, the limb should be kept in the extended position, and the bones in perfect apposition, during its application, and it should extend sufficiently high, to paralyze all the muscles concerned in the motions of the limb. It should be reapplied every six or eight days, or so often as it may become loose in any part, so as to give unequal pressure.

When the bandage is thus applied, by its compressing influence, the muscles will be completely paralyzed, or at least reduced to a state of perfect quiescence, and independent of any ^{other} effect of a well adjusted roller, by its completely suppressing muscular action, the greater obstacle to the quiet condition of the

bone, will be effectually removed, all danger
of displacement, and the pernicious consequences
of such displacement, will be obviated,
and thus, a very great desideratum in the
treatment of fractures will be obtained.
But this is not the only beneficial effect of
the bandage. By its equal compression, the
capacity of the arteries will be diminished, the
free influx of blood will be prevented, a greater
quantity than is essential to the restorative
process, cannot be impelled through them, ac-
cumulation and engorgement cannot take
place, and inflammation and swelling cannot
supervene. But admitting that they have ac-
curred, the bandage is equally proper; for by
its action on the vascular system, it will speedily
dissipate inflammation; and as it increas-
es in an astonishing degree the activity of
the absorbents, tumefaction will quickly dis-
appear.

The bandage blunts the sensibility of the parts to which it is applied, and obviates, by promoting the superminution of a high degree of inflammation, the very exquisite sensibility which attends exalted inflammatory action, and thus prevents the occurrence, or produces a diminution of pain, more certainly than any narcotic - hence, I am constrained to pronounce it, the most certain anodyne in fractures. To illustrate my views, and to demonstrate the efficacy of the plan of treatment recommended, I will insert a case; and as oblique fractures are acknowledged to be of most difficult management, and most apt to terminate in deformity, the case shall be of that character.

In the fall of 1828, a servant boy, aged eighteen or twenty years, the property of a respectable planter in the vicinity of Lexington Kentucky,

was thrown from his horse in the streets of
Leamington by the fall, his thigh was fractured
at or a little above its middle. Dr Dudley
was requested to visit him. The fracture being
of the oblique character, the inferior portion
was drawn two or more inches upon the poster-
ior surface of the superior fragment. By ex-
tension and counter-extension, the fragments wa-
re reduced to their proper situation, and be-
ing so retained by the same forces, a band-
age was applied from the extremities of the
tendons to the superior part of the limb, and the
en passed several times around the pelvis
and thus made secure. To prevent displace-
ment, from any involuntary movements of
the body, during sleep or otherwise, four spli-
ints, about ten inches in length and one and
a half or two inches breadth, were then bound
on with moderate firmness. On the seventh or

and then, for the purpose of the study of
the subject, it is necessary to have a
clear and distinct view of the subject.
The first step is to define the subject.
The second step is to divide the subject
into its parts. The third step is to
explain each part. The fourth step is
to show the relation of the parts to
the whole. The fifth step is to give
examples of each part. The sixth step
is to give examples of the whole.
The seventh step is to give examples
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eightth day the dressings were renewed; and by their reapplication at three or four succeeding periods, ten days elapsing between the renewals, the boy was restored to perfect health, without the slightest deformity, and without the presentation of a single manifest symptom during the progress of cure.

Without speaking particularly of the practices of all the different bands, I will here remark, that the same principles should govern us in all; that in some cases, a modification of splints and position will be necessary, as in those of the forearm, &c. After these remarks, which were made with more particular allusion to simple fractures, I will now say a few words on compound fractures.

It is in these that we meet with lacerated muscles, ruptured blood vessels, and infu-

and nerves; and these are the injuries which more than any others, elicit the sympathies of the benevolent and philanthropic practitioner, and call most loudly for assistance from the surgeon. Her, in accordance with the most fashionable mode of treatment, placed the limb in the most easy and convenient position, and endeavoured to moderate inflammatory action, by leeches, lotions, &c; and after the subsidence of inflammation, placed the bones in apposition, and applied his dressings: a false and inefficient practice.

What did the Surgeon fear in compound fractures? high inflammation, and consequent suppuration, deep-seated abscesses, sloughing, sinuous ulcers, necrosis of the bone, contraction and deformity, or at least, a protracted and painful cure.

Now as the pathology of the affected tissues

taught us, that a high degree of inflammation, is not a necessary antecedent to the ^{deposition} of ossific matter, but on the contrary retards and deranges that process; I without hesitation express it as my decided opinion, that it would be better, after the removal of any detached portions of bone, immediately to place the fragments in their proper position, and having drawn the divided integuments in contact, and secured them by adhesive straps, by the immediate application of the bandage, to procure union by adhesion, and thus convert the compound into the simple fracture, than to subject the unfortunate sufferer to the torturing pains accompanying high inflammatory action, to a long term of acute distress, and to the liability to the evils above mentioned, all of which, not unfrequently present themselves in-

der the common mode of treatment, but none of which could take place, under the influence of a properly adjusted bandage.

After these salutary remarks on compound fractures, I will proceed to make a few observations on fractures of the patella.

Transverse fractures of this bone are more common; but sometimes it is fractured perpendicularly. When the fracture is of the transverse character; by the action of the rectus, vasti, & Cruralis muscles, the superior ^{fragment} is drawn from the lower; in a degree proportional to the extent of injury sustained by the capsular ligament, and the tendinous aponeurosis covering it.

The depression between the two portions of bone, the situation of the superior fragment on the anterior part of the thigh, and the incapacity to extend the leg, will clearly indic

ate the nature of the accident.

As an examination of the plans of treatment recommended by different authors, would be a useless expenditure of time, I will merely remark, that so far as my knowledge extends, they agree in saying reunion by bone is rarely if ever effected; and ^{that} some of the highest authorities, after the subsidence of inflammation, which they endeavour to abate by leeching, evaporating lotions, &c, approximate the ends of bone, and attempt to secure them in their proper position, by pads, buckles, straps, &c, &c; and thus endeavour to procure reunion by ligament or bone, as the case may be; and proscribe the early application of the bandage, as likely to increase pain and swelling, and to induce a sloughing condition of the parts; effects, which the bandage when properly applied, never produces.

To prevent the occurrence of all unlooked for
inflammations, and to procure union by force, the
bandage should be immediately applied.
Commencing at the toes, it should be con-
tinued to the inferior edge of the fractur-
ed bone; another bandage should be pass-
ed around the pelvis that it may be secur-
ed, and then continued down the thigh until
it reaches the superior margin of the patella,
an assistant at the same time drawing the
fragments in contact; it should then be so
applied as to form the figure of eight, and
afterwards passed in spiral turns around
the whole.

Without recapitulating the effects of the
bandage, I will just remark, that as the
action of the muscles is the great obsta-
cle to the perfect apposition of the divided
surfaces, and a high degree of inflam-

ment the only circumstance endangering the favourable termination of the accident, these difficulties will be perfectly obviated by the compressing and paralyzing influence of the bandage; and in side or right use, the patella will be firmly united by long sinews.

During the progression of recovery, the leg should be extended on the thigh, and the thigh flexed on the pelvis. At the expiration of the fourth week, slight passive motion should be commenced, and conducted with great caution. It should be employed from day to day, until the cure be complete.

As a demonstration of the efficacy of the treatment recommended, I will here remark; that Professor Lindley of Transylvania University has treated a variety of cases in the manner above described, and has invariably

11
effective union by a specific matter.

Compound fractures of the patella are more difficult to manage; and it is in these that the bandage promised to be pre-eminently useful.

The consequences most to be apprehended in these cases, are ungovernable inflammation, succeeded by suppuration, with the highest degree of constitutional irritation.

Now as there is no such thing in nature, as an effect without a cause, and as we know that the suppuration and constitutional irritation are effects of the local inflammation, to obviate them, we have nothing to do but to prevent the occurrence of their cause; and this will be ^{more} certainly effected by the roller, than any mode of practice that can be adopted.

After securing the divided integuments in contact by adhesion straps, the bandage sh

could be applied as directed in cases of simple fracture. The result of this treatment will be union of the soft parts by adhesion, suppression of the inflammation and constitutional irritation which so generally succede this injury, and in a few weeks, perfect restoration of function.

The rules laid down for the management of fractures of the patella, are equally applicable to those of the olecranon, and if strictly adhered to, the results will be similar. From the subject of fractures, I will proceed to make a few remarks on luxations.

Dislocations

A dislocation is a displacement of the articulatory portion of a bone from the surface on which it was naturally received. When in addition to the displacement of the articulating surfaces, the cavity of the

joint is exposed by a solution of continuity in the skin and capsular ligament, it is called Compound dislocation.

The consequences to be apprehended from luxations, particularly those of the Compound character; are inflammation of ^{the} lacerated integuments, ligaments, and synovial surface, suppuration, great constitutional irritation, abscesses about the joint, inflammation of the bones, prostrations from the ends of bones abscesses of their cartilages by ulcerative action, and finally, ankylosis.

In these cases the bandage will be found invaluable - by its immediate application the escape of synovia and transudation will be prevented; or if they have occurred, their farther progress will be arrested, and the swelling speedily reduced by the increased action of the absorbents; it will in some degree act.

as an artificial capsule, the divided parts will be retained in contact, inflammatory action will be duly restricted, union by the first intention will ensue; and the parts will be speedily restored to their healthy condition, without the manifestation of a single phenomenon calculated to disturb nature in her salutary operations.

From the foregoing remarks it will be observed, that I conceive the bandage to be the most effectual mean in fulfilling the second indication in the treatment of luxations; which is the prevention of high inflammation.

The first indication, is the reduction of the displaced bones to their natural situation. This will be accomplished by extension and counter-extension; aided when necessary, by traction, warm bath, nauseating medicine, &c.

Were it necessary, I could here detail several cases of compound dislocation, which were treated by the lancet with perfect success, and without the occurrence of any of the unpleasant symptoms, which so frequently follow these accidents.

Gunshot Wounds.

By many of the highest authorities it is said, that a gun shot in its passage through any portion of the body, destroys the vitality of the parts immediately in its tract, and that sloughing is a necessary step towards reparation or cure.

As I have neither time nor disposition to enter into a particular examination of the opinions of the many authors on this subject, I will merely remark, that I believe many of them to be incorrect, and that they were based on incorrect views of the pathology of gunshot injuries.

There is nothing, however, in the
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A gun-shot lacerates and weakens the parts through which it passes, the capillary vessels in its route are debilitated and paralyzed, their capacity for the performance of their functions is temporally suspended; thus inflated and incapacitated, they admit a free influx of blood and are unable to propel it, they become engorged, and by their efforts at propulsion their vitality is finally exhausted; the blood stagnates and coagulates, and sloughing succeeds.

When nature is unassisted, this series of events does take place; and then it is said, that a gun-shot kills the parts through which it passes, and that sloughing is essential to recovery. These assertions are erroneous; for instance of the sloughing being a necessary effect of a gun-shot wound, it is nearly a coincidence of fable and inefficient practice.

tics; a practice which originated in ignorance of the true nature of gun-shot wounds; and which has been perpetuated by a disposition possessed by too many, which induced us to receive without scrutiny, and believe correct, every thing that comes from high authority; and to follow the old beaten tract be it right or wrong. The death of the parts is to be ascribed to over-distention, and the action of the vessels in the very first condition to which they are reduced by the gun-shot; or in other words; over-distention, and by the action of the vessels themselves, wear out or destroy their vitality.

Governed by these views of the pathology of gun-shot wounds; the only rational mode of treatment would be, to aid nature by giving support to the morbid vessels. This object will be most conveniently and effectually

ally accomplished by the roller, when the vessels are so situated as to admit its application. By its compression engorgement will be prevented, the vessels will be supported and strengthened, and enabled to circulate their fluids and throw out adhesion matter, and union by the first intention will quickly reestablish the continuity of parts.

The correctness of these views, or at least the efficacy of the treatment, has been incontrovertibly proven, by many cases in the practice of the distinguished Professor of Surgery in the Anglo-Lancian University. In his lectures he gave among other cases, that of a gentleman, who in personal combat, received the ball of his antagonist in his right thigh - the ball in its passage divided the femoral artery. The hemorrhage being instantly arrested by pressure on the artery at its passage over the

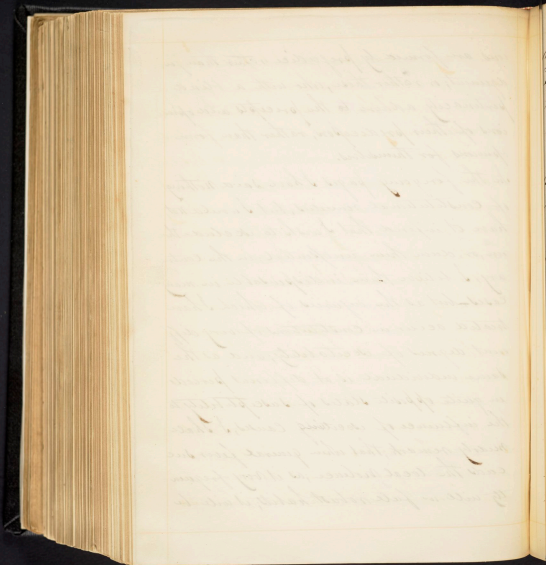
put, a compress was placed over the wound and in the direction of the artery; and the bandage applied from the inferior to the superior extremity of the limb.

The wound of the gun-shot healed by the first intention; and in three or four weeks, the patient was perfectly restored and superintending his business.

Let it should be said, that there might have been something peculiar in this case; and that it does not affect the general position, that sloughing and suppuration are necessary consequences of gun-shot wounds; I will remark; that Dr. DuRoi has treated a variety of cases in the same manner; and with a uniformity of success, that would overcome any tolerable degree of incredulity; and satisfy any one of the efficacy of the treatment; unless it be those, whose opin-

ious are formed by prejudice rather than judgment; or rather those, who with a blind pertinacity adhere to the precepts and opinions of their predecessors, rather than form opinions for themselves.

In the foregoing pages I have said nothing of Constitutional remedies, but I would not have it infered that I wish to exclude them, or deem them unessential; on the contrary, I believe them indispensable in many cases—but as the injuries of which I have treated occur in constitutions of very different degrees of excitability; and as the same individual is at different periods in quite opposite states of susceptibility to the influence of exciting causes, I shall merely remark; that when general fever succeeds the local violence; as it very frequently will in full robust habits, it will be



necessary to use the lancet, to purge, to bleed,
and in short to enforce the antiphlogis-
tic regimen to the requisite extent that these
accidents may prevent themselves in feeble de-
bilitated constitutions; in which the powers of
Nature are so prostrated that Stimulants, to-
nics, and a free use nutritious food may
also become necessary: in such cases Nature
must be supported and elevated to the
healing point - that these injuries will oc-
casionally be met with in individuals la-
bouring under Chylopoetic Derangement
such cases it will be expedient to correct
the morbid condition of the Stomach, liver,
&c, by the judicious exhibition of Pe-
ru, Sile, Calomel, the mineral acids, &c.
In fine, the good sense of the Surgeon must
adapt his remedies to the peculiari-
ties of each case. With these remarks I

close my paper, at the same time apolog-
izing for its many imperfections.

Let my paper be the same time
written in many in perfection

No 115

C.

24 Samson

prophets

Popes - March 10th 1828

